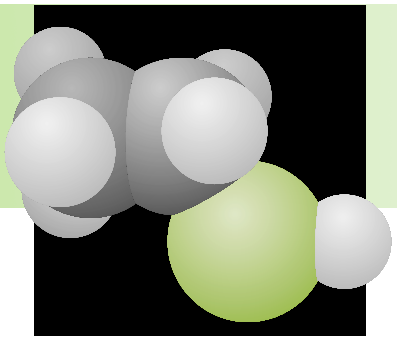
CHEMICALS

Project Fact Sheet



2001 Industrial Partnerships

Benefits

- Increases energy savings
- Increases revenues
- Decreases environmental impacts
- Decreases amount of waste produced by recovering saleable products from wastes
- Increases industry competitiveness

Applications

These new technologies are applicable throughout the chemical processing industry and provide cross-cutting applications to several other energy intensive industries.

The U. S. Department of Energy's Office of Industrial Technologies (OIT) Chemicals Industry of the Future recently awarded eight new research projects of benefit to the U.S. chemical industry. The eight projects represent the latest in a series of collaborative R&D Partnerships formed under OIT's innovative Industries of the Future program. This program is closely aligned with Vision2020, an industry-led partnership of chemical manufacturers, suppliers, universities, and research laboratories that seeks, by 2020, to effect a 30 percent reduction in the U.S. chemical industry's use of key resources, as well as its output of emissions and effluents. The chemical industry defines their goals and R&D priorities, laying the groundwork for industry-government partnerships to share the costs and risks of pre-competitive R&D to develop new chemical science and engineering technology which help meet national goals for energy and the environment.

Solution Crystallization Modeling Tools

OLI Systems and Fluent, Inc. will collaborate with Dow Chemical, Eli Lilly, the University of Utah, Iowa State University, the University of Sheffield, Illinois Institute of Technology, and the AIChE Design Institute for Physical Property Research to develop and provide tools for engineering design, scale-up and crystallization process optimization. Crystallization is the most widely used separation and purification process for chemical products that are solids at room temperature and pressure. The new software tools will help design crystallizers for minimum product loss, and maximum energy efficiency and product production rate. U.S. energy savings of 12 trillion Btu per year are projected by 2020.

Distillation Column Modeling Tools

The Separations Research Program at the University of Texas, Austin, Oak Ridge National Lab, Dow Chemicals, Koch-Glitsch, Praxair, Sulzer Chemtech, and Fluent, Inc. will develop advanced computational techniques to model distillation column operation for use in process optimization and improvement of column packing design. A commercialized software package for use on next generation computers will be made available across the industry to optimize distillation column operations, saving an estimated 53 trillion Btu per year by 2020.

Purification Process for PTA production

GTC Technology Corporation in partnership with ISP, Formosa Plastics US and Montana State University will develop a revolutionary process for Purified Terepthalic Acid (PTA) manufacture. PTA is the basis for polyester fiber which is widely used in a variety of consumer products. The new process will effect a 5 trillion Btu per year U.S. energy savings and 30 trillion Btu per year worldwide, reduce operating costs by 70 percent by enabling the use of lower purity feedstocks to produce the same quality PTA, and eliminate the need for exotic materials of construction due to the inherent non-corrosive solvents used in the new process.

Enhanced Heat Exchangers for Process Heaters

The Gas Technology Institute and UOP will collaborate to enhance heat transfer efficiency in natural gas-fired process heaters by using a dimpled heat exchanger tube design that can be applied to tens of thousands of fired heaters across the chemical processing industries. Successful commercialization of this new technology will result in an energy savings of 17 trillion Btu per year of primarily natural gas by 2020.

Oxidative Olefin Reactor

Ethylene is one of the most energy and capital intensive processes in the petrochemicals industry. Praxair, BP Amoco, and the University of Delaware are partnering to develop a new process for a step-change reduction in capital expenditures and environmental emissions associated with the manufacture of ethylene. This process combines the use of BP's short reaction time catalyst and process knowledge with Praxair's gas mixing technology to provide a novel oxidative dehydrogenation reactor. This process does not require external heat at high temperature as does the conventional steam cracking technology. Commercialization will bring about a dramatic reduction in energy consumption and production costs for ethylene manufacture and other similar cracking reactions including ethylene and propylene from propane, butane, and naptha feedstocks. U.S. energy savings of 19 trillion Btu per year by 2020 are projected.

High Throughput Catalyst Screening

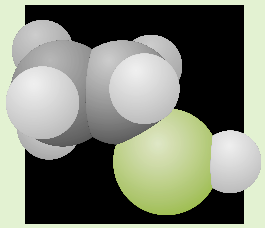
TDA Research in collaboration with Akzo Nobel will develop a combinatorial catalyst testing apparatus that will be capable of testing an array of catalysts under realistic industrial conditions. The instrument will be an affordable entry point for large and small companies to acquire high throughput catalyst testing capability. Providing such a tool to the R&D programs throughout the chemical industry will rapidly accelerate the discovery of new heterogeneous catalysts. The apparatus will be demonstrated initially to screen for new catalysts for the production of ethylene, a large energy intensive process. U.S. energy savings of 123 trillion Btu per year by 2010 are projected.

Ethylene Process Design Optimization

BP Amoco and AspenTech will develop an optimized process configuration for an advanced olefins plant. Since the construction of existing olefins plants, significant energy efficient technologies have emerged, many of which have not been adopted (e.g. advanced separators, furnaces and cracking tubes). This project will consider the system integration of all the modern advancements to the design of an olefins plant with the best possible optimization. On a per pound of product basis the new design could result in: a 15 percent decrease in energy consumption, 15 percent lower greenhouse gas emissions, 2 percent higher process efficiency, and a 15 percent reduction in overall cost of production will be achievable using this new approach to plant design and optimization. U.S. energy savings of 29 trillion Btu per year by 2010 are projected.

Accelerated Characterization of Polymer Properties

GE, Cytec Industries, and DACA Instruments will develop a suite of microanalysis techniques that can rapidly measure a variety of polymer properties of industrial importance. This enabling technology will provide a combinatorial or high-throughput methodology for achieving enhanced polymer performance. Such an approach is expected to revolutionize the polymer and polymer additives industry. Implementation of this technology will result in polymers with enhanced end-use performance, driving plastics into new product lines and markets, while at the same time reducing energy consumption in the polymer industry by an estimated 20 trillion Btu per year by 2020.



OIT Chemicals Team

Paul Scheihing
Team Leader
Phone: (202) 586-7234
Fax: (202) 586-3237
paul.scheihing@ee.doe.gov

Tom Robinson
Chemical Processing
Phone: (202) 586-0080
Fax: (202) 586-9234
thomas.robinson@ee.doe.gov

Charles Russomanno
Chemical Processing
Phone: (202) 586-7543
Fax: (202) 586-1658
charles.russomanno@ee.doe.gov

Charles Sorrell
Materials
Phone: (202) 586-1514
Fax: (202) 586-3237
charles.sorrell@ee.doe.gov

Brian Valentine
Chemical Processing
Phone: (202) 586-1739
Fax: (202) 586-1658
brian.valentine@ee.doe.gov

Please send any comments, questions, or suggestions to webmaster.oit@ee.doe.gov

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Office of Industrial Technologies
Energy Efficiency
and Renewable Energy
U.S. Department of Energy
Washington, D.C. 20585

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